

NON-PUBLIC?: N  
ACCESSION #: 9212210351  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Clinton Power Station PAGE: 1 OF 04

DOCKET NUMBER: 05000461

TITLE: Failure of Air Supply Line on Feed Pump Minimum Flow  
Valve Results in Loss of Reactor Water Level, Recirc  
Runback, Operation in the Restricted Region and Manual  
SCRAM  
EVENT DATE: 11/22/92 LER #: 92-010-00 REPORT DATE:

OTHER FACILITIES INVOLVED: None DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 075

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: O. Villareal, System Engineer, TELEPHONE: (217) 935-8881  
Extension 3098

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: SJ COMPONENT: V MANUFACTURER: C600  
X SE V F130  
REPORTABLE NPRDS: Y  
N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

With the plant at 75 percent reactor power, in accordance with plant procedures, a manual reactor SCRAM was initiated due to operation within the restricted operating region of the thermal power versus core flow operating map. Entry into the restricted region was due to an automatic fast closure (runback) of both reactor recirculation (RR) flow control valves (FCVs). The fast closure was initiated by the presence of a trip signal for the "A" Turbine Driven Reactor Feed Pump (TDRFP) and a decrease in reactor vessel water level to the low level alarm trip setpoint (Level 4). The "A" TDRFP was out of service for preplanned testing and inspection. Vessel water level began to decrease when the

"B" TDRFP minimum flow valve failed open due to a broken instrument air supply line. The rigid copper tubing instrument air supply line failed due to stress caused by long term exposure to normal system vibration. Corrective actions included replacing the rigid copper tubing air supply line on both the "B" and "A" TDRFP minimum flow valves with flexible stainless steel hoses.

END OF ABSTRACT

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#### DESCRIPTION OF EVENT

On November 22, 1992, at approximately 0312 hours, with the plant in Mode 1 (POWER OPERATION) at approximately seventy-five percent reactor RCT! power, a manual reactor SCRAM was initiated due to operation of the plant within the restricted operating region of the thermal power versus core flow operating map. Entry into the restricted region was due to an automatic fast closure (runback) of both reactor recirculation (RR) AD! flow control valves FCV!.

The unit had been reduced to seventy-five percent reactor power to accommodate turbine TRB! driven reactor feed pump (TDRFP) P! linkage inspection and feed pump trip testing. At the time of the event, the 'A' TDRFP was out of service for testing and inspection and the 'B' TDRFP was in service with control being provided by the Master Level Controller in three element automatic control.

At approximately 0302 hours the 'A' TDRFP testing, inspection, and maintenance was complete and operators were preparing to place the 'A' TDRFP back in service.

At approximately 0311 hours the 1/4-inch copper tubing TBG! line supplying instrument air LD! to the 'B' TDRFP minimum flow valve 1FW010B V! failed, causing the valve to fail open. During the next twenty-five seconds, reactor pressure vessel RPV! water level began to decrease due to the large amount of feedwater SJ! flow diverted through the open minimum flow valve. The speed of the 'B' TDRFP automatically increased to compensate for the decreasing RPV water level, but the 'B' TDRFP was unable to reverse the decreasing level trend prior to the water level reaching the low level alarm trip setpoint (Level 4), at approximately 0312 hours.

The low level trip signal, along with the existing trip signal of the off-line 'A' TDRFP, automatically initiated a RR FCV fast closure which reduced recirculation flow. The reduced recirculation flow resulted in

the plant operating in the restricted region of the thermal power versus core flow operating map. The control room operator initiated a manual SCRAM by placing the reactor mode switch HS! in the shutdown position, as required by CPS procedures 3302.01, "Reactor Recirculation," and 4008.01, "Loss of Reactor Coolant Flow." As the reactor water level decreased to the low reactor water level (Level 3) trip setpoint, SCRAM signals initiated and containment isolation valves in Groups 2 (Residual Heat Removal BO! to upper containment pools), 3 (Residual Heat Removal shutdown cooling), and 20 (miscellaneous) automatically responded as designed.

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At 0313 hours with the RPV water level recovering, the main turbine generator TG! and 'B' TDRFP both tripped on high reactor water level (Level 8) and the bypass valves opened to maintain reactor pressure control.

At 0314 hours, the SCRAM signal was reset. At 0333 hours, operators started the motor MO! - driven reactor feed pump to control reactor water level. The plant was stabilized in Mode 3 (HOT SHUTDOWN).

During this event, four extraction steam SE! drain valves (1ES026A, 1ES029A, 1ES031A, and 1ES033A) failed to open as designed; however, these failures did not cause or contribute to this event. The drain valves were repaired in accordance with Maintenance Work Request (MWR) D32514.

No other automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No other equipment or components were inoperable at the start of this event to the extent that their inoperable condition contributed to this event.

#### CAUSE OF EVENT

The cause of this event is attributed to the failure of the 'B' TDRFP minimum flow valve 1FW010B. The rigid copper tubing supplying instrument air to the 1FW010B valve failed resulting in the valve failing open. The tubing failure was caused by stress due to long term exposure to normal system vibration.

#### CORRECTIVE ACTION

The rigid copper tubing supplying instrument air to minimum flow valve 1FW010B was replaced with flexible stainless steel hose. The use of flexible instead of rigid tubing should reduce stress to the tubing

material. In addition, to prevent a similar failure from occurring on the 'A' TDRFP minimum flow valve 1FW010A, that valve's copper tubing instrument air supply line was replaced with flexible stainless steel hose. Replacement of the air supply lines for these valves was completed in accordance with Field Engineering Change Notice (FECN) 24523 and MWR D32246 on November 22, 1992.

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#### ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73 (a)(2)(iv) due to the manual actuation of the Reactor Protection System JC!.

Assessment of the safety consequences and implications of this event indicates that this event was not nuclear safety significant. This event was analyzed and found to be consistent with the analyses in the Loss of Feedwater Flow and Recirculation Flow Control Failure - Decreasing Flow transients as discussed in Chapter 15 of the Updated Safety Analysis Report. This event was found to be within the design basis of the plant. The capability of the plant to perform its intended safety functions and achieve and maintain a safe shutdown was not affected by this event.

#### ADDITIONAL INFORMATION

The "B" TDRFP minimum flow valve which failed open during this event due to a broken instrument air supply line is a 12-inch, air-operated drag valve, model CCI-PISTON, manufactured by Control Components. The four extraction steam drain valves which failed during this event are air-operated 2-inch control valves and 1-inch globe diaphragm valves, model number 657-ES, manufactured by Fisher Controls.

Clinton Power Station has reported several SCRAM events caused by valve failures, but none with air supply line failure as a root cause.

For further information regarding this event, contact O. Villarreal, System Engineer, at (217) 935-8881, extension 3098.

ATTACHMENT 1 TO 9212210351 PAGE 1 OF 1

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U-602079  
L45-92(12-15)-LP  
2C.220

December 15, 1992  
10CFR50.73

Docket No. 50-461

Document Control Desk  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: Clinton Power Station - Unit 1  
Licensee Event Report No. 2-010-00

Please find enclosed Licensee Event Report No. 92-010-00: Failure of Air Supply Line on Feed Pump Minimum Flow Valve Results in Loss of Reactor Water Level, Recirc Runback, Operation in the Restricted Region and Manual SCRAM. This report is being submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

F. A. Spangenberg, III  
Manager, Licensing and Safety

NEL/msh

Enclosure

cc: NRC Clinton Licensing Project Manager  
NRC Resident Office  
Regional Administrator, Region III, USNRC  
Illinois Department of Nuclear Safety  
INPO Records Center

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